

REMARKS

Claims 1-3, 5-13, and 15-22 are pending in the application.

Claims 1-22 stand rejected.

Claims 4 and 14 have been canceled without prejudice herein.

Claims 1, 11, 21, and 22 have been amended.

Applicants express heartfelt thanks to the Examiner for finding Applicants' arguments persuasive regarding the response filed on December 13, 2005, and for withdrawing the claim rejections set out in the October 17, 2005 Office Action. Applicants further express thanks to the Examiner for consideration of the Information Disclosure Statement filed November 1, 2005.

Rejection of Claims under 35 U.S.C. §102

Claims 1-22 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Talagala, et al., U.S. Patent Publication No. 2003/0167439 ("Talagala"). While not conceding that the cited reference qualifies as prior art, but instead to expedite prosecution, Applicants have chosen to respectfully disagree and traverse the rejection as follows. Applicants reserve the right, for example, in a continuing application, to establish that the cited reference, or other references cited now or hereafter, do not qualify as prior art as to an invention embodiment previously, currently, or subsequently claimed.

The claims have been amended to emphasize the fact that new first parity data is generated as a function of only the first striped unit data. Support for the amendments can be found in paragraph 0014 of the original specification. Amended independent claims 11, 21, and 22 generally recite the limitations of amended independent claim 1 which states the following:

In a RAID data storage system comprising a RAID stripe, wherein the stripe comprises a plurality of stripe units including a first stripe unit, a method comprising:

- receiving a request to read data, wherein the request is received from a computer system in data communication with the RAID data storage system;
- reading first parity data corresponding to the first stripe unit data in response to receiving the request;
- generating new first parity data corresponding to the first stripe unit data, wherein the new first parity data is generated as a function of only the first stripe unit data;
- comparing the first parity data with the new first parity data;
- returning data of the first stripe unit to the computer system if the first parity data compares equally to the new first parity data.

In the Office Action dated March 10, 2006, paragraphs [0035] and [0041] of Talagala are cited in an attempt to demonstrate Applicants' independent claim 1.

[0035] In step 403, a data integrity error is detected in a first vertical redundant relationship. This data integrity error can be detected using various methods. In one embodiment, each time host 102 requests a data block from array 108, the checksum corresponding to that requested data block is also retrieved and compared to the data block. *This comparison may be performed by calculating a new checksum for that data block and comparing that calculated new checksum to the original checksum.* A data integrity error is detected if there is a mismatch between the calculated checksum and the original checksum. In other embodiments, the checksums for all of the blocks of data on a disk drive are reviewed periodically to search for data integrity errors. This periodic review can occur, for example, on a daily, weekly, or monthly basis in order to search for data integrity errors in data blocks which are infrequently accessed by host 102.

[0041] *If the stripe parity does not contain a data integrity error, it may be reasonable to rely upon the stripe parity and assume that the data stored in stripe units A(0)-A(3) remains valid and that all of the detected data integrity errors reflect data corruption in the checksums, not the stripe units. Therefore, in step 415, new checksums are created based on the existing data in stripe units A(0)-A(3) to replace all of the original checksums which do not match with their corresponding stripe units.*

(Talagala paragraphs [0035] and [0041], italics added for emphasis)

Upon careful review of the cited portions of Talagala, Applicants' respectfully submit that the checksum retrieval and calculation of Talagala does not equate to Applicants' claimed reading of first parity data, generating new first parity data, and comparing the first parity data with the new first parity data. As appreciated by those of ordinary skill in the art, checksum calculation is different than the claimed generating of parity data. Even the cited portions of Talagala distinguish between checksum and parity data when Talagala demonstrates that stripe parity is relied upon as an alternative approach to the checksum retrieval (see paragraph [0041]).

Applicants respectfully submit that Talagala paragraph [0039] appears to more closely resemble Applicants' amended independent claim 1.

[0039] A storage system having three or more data integrity errors in its vertical redundant relationships suggests that a serious error may exist from which any data recovery may be unreliable. Therefore, in some embodiments, such as those in which data integrity is of utmost importance, it may be desirable to report a data loss condition in the event any three or more checksums contain data integrity errors. In other embodiments, it may be desirable to attempt to recover from a triple checksum error condition if a sufficient degree of reliability can be achieved. FIG. 4c illustrates one methodology which may be used in the triple error case. In step 412, the horizontal redundant relationship for the data blocks is reviewed. In embodiments where the horizontal redundant relationship comprises a RAID 5 parity group, this review is performed by *performing a stripe integrity test in which the stripe parity for stripe units A(0)-A(P) is verified*. This verification can be performed, for example, by calculating a new parity stripe unit based on the four data stripe units A(0)-A(3), and then comparing the new parity stripe unit to the existing parity stripe unit A(P). A horizontal redundancy data integrity error is identified in step 413 if the new parity stripe unit does not match with the existing stripe unit A(P).

(Talagala, paragraph [0039], italics added for emphasis)

However, among other deficiencies, the cited portions of Talagala fail to depict the claimed "returning data of the first stripe unit to the computer system if the first parity data

compares equally to the new first parity data” as recited in amended independent claim 1. At most, Talagala demonstrates replacing “the original checksums” (see paragraph [0041]), and the cited portions of Talagala are silent regarding the claimed returning of “data of the first stripe unit to the computer system if the first parity data compares equally to the new first parity data.”

Further, unlike Applicants’ amended claim 1, the cited portions of Talagala show “calculating a new parity stripe unit based on the four data stripe units...” (see Talagala, paragraph [0039]). In contrast, Applicants’ amended claim 1 recites “generating new first parity data ... as a function of *only* the first stripe unit data...” (italics added for emphasis). Thus, Applicants’ amended claim 1 is patentable in view of Talagala because the new first parity data of Applicants’ claim 1, as amended, is generated as a function of only the first stripe unit data rather than being based on multiple stripe units as in Talagala.

For the above reasons, Applicants respectfully request that the Examiner withdraw the 35 U.S.C. § 102(e) rejection of amended independent claims 1, 11, 21, and 22 as being anticipated by Talagala. As dependent claims 2-3, 5-10, 12-13, and 15-20 add limitations to their otherwise allowable independent base claims, respectively, Applicants respectfully request that the Examiner withdraw the 35 U.S.C. § 102(e) rejection of these claims as well.

CONCLUSION


Applicant(s) submit that all claims are now in condition for allowance, and an early notice to that effect is earnestly solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is requested to telephone the undersigned.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P. O. Box 1450, Alexandria, Virginia, 22313-1450, on May 10, 2006.


Attorney for Applicant(s)

5/10/06
Date of Signature

Respectfully submitted,



Russell C. Scott
Attorney for Applicant(s)
Reg. No. 43,103
Telephone: (512) 439-5089
Facsimile: (512) 439-5099